423
M61F

File Copy 510

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

FOREST INSECTS.

John Martin Miller.

April 27, 1911

[redacted]

CALIFORNIA FOREST & RANGE EXPERIMENT STATION
330 GIANNINI HALL, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

CALIFORNIA FOREST AND RANGE
EXPERIMENT STATION
LIBRARY COPY

M—5123 U. S. GOVERNMENT PRINTING OFFICE: 8—7417

LIBRARY

OF THE

UNITED STATES
DEPARTMENT OF AGRICULTURE

Class _____

Book _____

M-5187 U. S. GOVERNMENT PRINTING OFFICE 8—1577

April 27, 1911.

CALIFORNIA FOREST
EXPERIMENT STATION
LIBRARY COPY

423
M61F

F O R E S T I N S E C T S.

John M. Miller. Forest Service.

Any discussion of the insect problem in this meeting must necessarily be limited to the economic features. Every Supervisor here is interested in the production of the timber. By this product he hopes to make his Forest not only self supporting but profit bearing. The agencies which are destructive to his growing crop of timber are often as much his concern as those which he must study to make his Forest more productive.

Insect damage often appears in his standing timber, sometimes in the young seedlings and reproduction, sometimes in the half finished product, and again in the loss of some veteran which has been over a century in the making. To this extent only is he concerned with forest insects. The host of varied and interesting species which people his Forest, the peculiar life histories and remarkable adaptations of these tree dwellers, all form a most inviting field for systematic study. Some of the field men of the Service may give a little of their time and attention to this subject for reason of its appeal to their interest. But

CALIFORNIA FOREST & RANGE EXPERIMENT STATION
330 GIANNINI HALL, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

In the first place, is this discussion worth while? Does the amount of insect damage in the territory for which you men are responsible, justify a part of your time and attention? If not, we had better leave this whole attractive subject to the entomologist, and give our thought to those lines of work which are vital to National Forest interests.

The amount of damage cuased by insects in the National Forests of District 5 has never been carefully estimated. This can only be done by someone who has made a careful survey of the entire field. On some of the National Forests, however, we know that the presence of dead and dying timber is presenting a problem so acute as to force itself upon the attention of the Forest officers and timber owners. On the Sequoia, the persistent work of a tiny needle-miner has been the primary cause of the unhealthy and dying condition of the Jeffrey pine over quite a large extent of territory. The lodgepole pine is dying at a serious rate upon the Lassen as the result of an attack by the mountain pine bark-beetle. Timber owners near the Klamath are asking for some measures to relieve them from the continued annual loss of some of their best merchantable yellow pine, cuased by another species of bark-beetle, Dendroctonus brevicomis, while on National Forest land near here we found conditions to be equally as bad. And on nearly all the National Forests of the District can be found the scattered distribution of a few dangerous species - forest enemies which are now held in control by their own native parasites but which, under

some disturbance of the natural conditions of the timber, caused by fire or drought, are capable of developing into a pest of serious economic importance.

The presence of insect damage is probably less striking on account of the conditions of mixed stands which we find on many of our California forests. Many of the insect enemies are peculiar to only one species of tree, or are capable of doing their most serious damage on one host. The appearance of insect attack upon any one species of a mixed stand is often hidden by the healthy green foliage of surrounding trees. This may be a condition in our favor as well, as insect attack appears to spread less rapidly than in a pure stand.

Besides, in many of these same Forests, much of the timber is now overmature. Many of the veterans are in the decadent stage and fall an easy prey to the attack of primary, and even secondary, insect enemies. The old trees also make a very favorable breeding place for some species of bark-beetles, and frequently younger trees in their vicinity will die in a few years. This gives rise to the so-called "groups" of dead trees which are the most common form of insect killed timber on these forests. When an accurate estimate is made, it will probably be found that the greatest loss sustained by our Forests from this cause, is not in the few conspicuous local outbreaks that we now have, but in the continued annual loss of a few large trees scattered over the entire forest. These may not amount to more than three or four on each quarter section of the timber land of the forest, and the

loss in one season forms a very small percentage of the stand. As this is increased each successive year, the amount of merchantable timber which is lost to the forest begins to total up quite a figure in board feet after a series of years.

The argument that these trees, being over-mature, would die anyway, does not apply in all cases. Many of the trees in these groups are growing thriftly at the time of attack, and in many cases the older ones, if given a fair chance, would hold their own until market conditions could make them available.

But how are we going to know and recognize the presence of injurious insects in our forests? And what are we going to do about it when we find them? These are the first questions of the practical forester. Location is the first step in combatting these enemies. Infested trees must be selected at the proper time before any treatment of them can be undertaken. The appearance of fresh infestation in a new territory should be reported before it reaches the dangerous stage. Preventative measures are far better than curative and prompt action may save future loss.

If knowledge of technical entomology is considered necessary for this, we can hardly expect the average Forest officer to qualify. In a day crowded full of the details of administrative work, there is little time left for study over any tables of classification or the widely scattered literature of the entomologist. The scientific nomenclature of the subject can only be handled by the specialist. There is a constant description of new species

from various sources and a shifting of the established names that is confusing. The number of species of forest insects alone is too numerous to get into satisfactory text book form. The best that we can hope to do is to establish a series of common terms for a few of the important economic species, which can be understood by all Forest officers.

On the other hand we can hardly expect the expert to give his time to the ordinary work of patrol. There is already an efficiently organized force in the field. The ranger, who from the saddle, looks over most of the square miles of his district in a season, is probably the first who will notice the fresh appearance of insect work. It does not take a specialist to notice an unhealthy or dying group of trees. It does take some observation, a little more perhaps, than some of the rangers are in the habit of giving. We cannot ask that all Forest officers shall be entomologists, but it does not take an entomologist to know the common names and recognize the work of the most important insects affecting forest trees. The knowledge of the specialist is needed for the positive identification of species, and the scientific supervision of remedial work. But for the primary location of insect damage we will undoubtedly have to depend upon that allround man, the Forest Ranger.

To accomplish this, it is necessary first of all to reduce the science of forest entomology to more simple terms. To the layman it is hardly possible not to associate this science with that of the pathologist. The timberman is first attracted and

interested by the character of the injury to the tree. He is not collecting "bugs" or fungus. If he stops to consider the cause of the injury, and is sufficiently interested to observe this a second time, his identification will probably be based on the nature of the injury, or the character of the insect work. By a series of homely terms the horticulturalist is able to discuss the various diseases and pests which infest his orchards, and by observing the nature of the injury to his trees, such as that of "curl-leaf", "black-rot", "peach-borer", etc., he is able to recognize these when they appear.

What we seem to need worst is ome sort of a publication which will give us the A,B,C of the fungus and insect enemies of our forests. This should contain brief, illustrated descriptions of the important forms, and should be supplemented by a key based upon the character of the injuries to the host trees. This can be much simplified to the forester by arranging the entire key silviculturally, one key being arranged for the fungus and insect enemies for each of those commercial timber trees with which he is familiar. Some difficulties may arise in the use of this from the fact that secondary forms, which would have to be omitted from a publication of this sort, will sometime be found and confused with the primary ones. But such a publication will go far toward stimulating and systematizing the observations which field men will readily make in their routine work. It will give us a basis for effective protective work.

Besides this a collection of forest insects is needed, which can be made available to field men. This will be of little value unless it is arranged in life history series, showing the various stages of insect development, and especially the character of their work. There ought to be a good reference collection in the District office, and as soon as material is available, a small one in every supervisor's office.

You have probably found that some men show much more interest and adaptability in this sort of thing than others. A supervisor can do well to encourage the work of some member of his force along this line, in reporting insect infestation or in carrying out some experiments to determine a practical method of control. If there can be found someone on each forest capable of undertaking this sort of work, the situation can be taken in hand much sooner if a serious outbreak arises.

In this discussion we have emphasized but one feature of practical method - that of bringing the attention of the field men to this subject so that they can be relied upon for the prompt location of insect damage. The next step is that of selecting some method of cutting or of treating the infested tree or of finding some other means of destroying the insects. All the methods that we know now are largely theoretical or based on work that has been done in the Middle West under conditions quite different from those we find here. In spite of the fact that insect damage has been quite persistent in some part of the state, we have no record of any successful attempt to control these outbreaks. A set of

reliable experimental data should be available from which we can estimate the cost and effectiveness of any proposed method. A number of experiments have been attempted this season, but results cannot yet be secured, and our limited time will not allow us to take up the detail of this proposed work. It will take at least another year of the work before we can know what to depend upon from any of the proposed methods of fighting insect attack.